GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST-OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, JULY 31, 1895.

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The Tree Yuccas in the United States.

PERSONS, whose only acquaintance with Yuccas is with the little Bear Grass, or Yucca filifera, so common in northern gardens, whether they are old-fashioned or new-fashioned, will not easily forget the first sight of a tree Yucca growing on its native desert. The Yucca is an exclusively New World plant, and is distributed from the shores of Virginia and the plains of Colorado to Central America. There are probably sixteen or eighteen species of these plants, although many more have been described—often in Europe from cultivated individuals. Yuccas are difficult plants for the botanist to manage, owing to their size and nature; and it is almost impossible to preserve in herbaria specimens that adequately illustrate the species. Individuals of the same species vary widely in the length and width of their leaves and in the size of their flowers and fruit, so that the seedlings of one plant, scattered through the gardens of different countries, might be given different names by botanists familiar only with a few individuals. The difficulty of knowing these plants, too, is much increased by the fact that Yuccas very rarely produce fruit in cultivation, insects which only live in the regions inhabited by the different species being essential to secure the fertilization of the flowers. It is not surprising, therefore, that there is hardly a group of garden-plants about which there is so much confusion in books, and this confusion will never be cleared up until the different species are studied extensively in the field, and then gathered together in some California or Mexican garden where their development under normal conditions can be patiently watched.

The territory of the United States is inhabited by twelve or thirteen species. Of the distribution and character of these species much, fortunately, is already known from the careful studies of Engelmann and Trelease, although there is still plenty to learn about them. Seven of the species, ranging from the shores of the south Atlantic states, along the southern boundary of the United States to the coast of southern California, grow up from the ground with single stems, which usually branches in old age, and, therefore, must be considered trees—but strange-looking trees—with long rigid dagger or bayonet-like leaves and enormous clusters of creamy-white flowers, and with very little in common with the Birches, Pines and Willows of the northern forest.

The distribution, at least, of these seven tree Yuccas of the United States is at last fairly well known. Beginning in the east, Yucca aloifolia occupies a narrow coast belt from the neighborhood of the mouth of the Cape Fear River, in North Carolina, to Louisiana, growing in sandy Pine-barrens, and often on the sandy beaches of bays and salt-water lagoons. It is a sparingly branched tree, sometimes twenty feet high, growing with a single stem or with a cluster of spreading stems, and short dark green narrow, rigid leaves. This is the most common of all the tree Yuccas in cultivation, and is found under a number of names in gardens all over the world. It is to this species that the commonly cultivated variegated Yuccas belong.

Traveling from east to west, the next species encountered is Yucca Treculiana, the Spanish Dagger or Spanish Bayonet of western Texas, a tree sometimes thirty feet in height, with a comparatively slender trunk, numerous widespreading branches and long, sword-like, concave, blue-green leaves. This plant is common in south-eastern Texas, forming near the mouth of the Rio Grande, just back of the sand-dunes of the coast, straggling stunted forests, and further inland low impenetrable thickets. Southward it ranges over the plains of north-eastern Mexico, and westward up the Rio Grande valley to the high plateau in the south-western part of the state. It is this species which is now such a common and splendid ornament of the gardens of Austin, San Antonio and other cities and towns of western Texas. The portrait of one of these cultivated plants was published in the first volume of this journal (f. 10).

On the plateau of south-western Texas another arborescent species is very abundant and by far the most conspicuous feature of the vegetation in this part of the country. This is the Yucca baccata macrocarpa of Torrey, who united it with the stemless Yucca baccata of the Colorado plains, the Yucca baccata australis of Engelmann, the Yucca australis of Trelease, and the largest of the Yuccas that grow naturally within the territory of the United States. The distribution of this noble plant, which is occasionally forty feet high, is not yet satisfactorily determined. It ranges westward across the Rio Grande into New Mexico, but how far is not yet known; and it is probably this species which is seen by the traveler on the Mexican Central Railroad in Chihuahua. It may be distinguished from Yucca Treculiana, with which it grows near Sierra Blanca, in south-western Texas, by its deep green flat leaves, by the longer pendulous branches of the flower-cluster, by the larger and narrower flowers which hang gracefully on long slender pedicels and by the slender hooked beak of the fruit. A young tree of this Yucca was cut last April at Sierra Blanca and sent to New York to represent the species in the Jesup Collection of North American Woods in the American Museum of Natural History. After its long journey to New York by rail and ocean the rootless plant developed its flower-cluster in the Museum, where it was photographed by Mr. De L. C. Laudy, of the Museum. A reproduction of this photograph appears on page 305 of this issue and gives some idea of the habit of a small plant of this species, and of the form and character of its magnificent cluster of flowers, which well distinguish it from Yucca baccata.

From the plains of western Texas another species ranges over those of southern New Mexico and Arizona and the adjacent borders of Mexico. This is Yucca elata, a plant of entirely different aspect, with a slender stem ten or twelve feet tall, branched and clothed at the top with short, narrow, rigid leaves, each branch being surmounted in early summer with a branched panicle of flowers often five feet long, and raised on a slender stalk from seven to ten feet high. At Deming, in New Mexico, at the junction of the Southern Pacific and Atchison, Topeka & Santa Fé Railroads, this plant begins to be abundant, and a little farther west it dots in countless thousands the desert which

it enlivens with its glorious panicles of flowers. A portrait of this plant was published on page 568 of the second volume of this journal.

So far as is now known, our fifth arborescent species is confined to the high mountain ranges of southern Arizona and northern Sonora. This is the Yucca Schotti of Engelmann, who afterward gave the name of macrocarpa to the same species. This is a flat green-leaved plant sometimes twenty feet high, and is easily distinguished from all our other Yuccas by the thick coat of white tomentum which covers the stem and branches of the flower-panicle. It is the only arborescent Yucca of the United States which grows on mountains, the other species being found on plains and deserts. Nowhere very common, it appears to grow most abundantly and to its largest size at elevations of from five to seven thousand feet above the level of the sea, although it is occasionally found at lower elevations where cañons open out into the mesas. This is probably the least known of all our Yuccas in cultivation. There are a few noble specimens, however, in the gardens of Tucson, Arizona, and seeds were distributed last year by the Arnold Arboretum. West of the Colorado River Yucca arborescens, or, as it is more commonly known, Yucca brevifolia, forms open, straggling forests on the Mohave Desert, and ranges to western Arizona, southern Nevada and southeastern Utah. This is a much-branched tree from thirty to forty feet high, with short rigid blue-green leaves and compact sessile clusters of small flowers. No forests on this continent are so weird as those of this tree, which is a source of never-ending astonishment and delight to travelers on the railroads that cross the Mohave Desert.

The last of our tree Yuccas is distributed from southern Nevada over the Mohave Desert, where it is not very abundant, through the passes of the San Bernardino Mountains to the California coast, along which it ranges northward as far as Monterey and southward into Lower California. This is the common and only arborescent Yucca of southwestern California, and is sometimes of tree-like habit, but more often produces from the ground several spreading stems. Long confounded with the stemless Yucca baccata of higher and more interior regions, it was first distinguished, under the name of Yucca macrocarpa, from that species by Doctors Merriam and Coville in their reports on the Death Valley Expedition. The name macrocarpa, however, having been previously applied to two other species of Yucca, this coast species is still in need of a name.

Our tree Yuccas all produce baccate, succulent, sweet, edible fruit, with the exception of Yucca elata and Yucca arborescens; that of the former is dry and pod-like, and that of the latter is covered with a thin coat of flesh, but does not split open like the fruit of Yucca elata and the other species with dry fruits.

Japanese Vegetation in California.

THE tendency toward extensive planting of Japanese trees, shrubs and flowers, particularly in the coast counties, grows more and more evident from year to year. Japanese gardeners are visibly increasing in numbers; the close of the war has already stimulated immigration. Nor is it only the gardener-class that counts in this respect. If California, as appears probable, is to have fifty or sixty thousand Japanese merchants, students and laborers of every class, oriental forms of gardening art will be fostered by all the newcomers, and the plants of Japan will be even more in demand. Some energetic importers have aroused public interest in Japanese vegetation; now we have local nurseries also, which prove attractive to Americans, and I expect to see the little Japanese gardener an indispensable adjunct of a fashionable country house before many years pass.

The Golden Gate Park possesses a good illustration of Japanese garden art, developed from the best of several gardens begun there during the early part of 1894 for the Midwinter Fair. Adults as well as children derive constant pleasure from these miniature landscape-gardens. What a terrible national genius such gardens exhibit! Century-old Pines and Oaks, crags, mountains, rivers and the whole free wilderness one sees compressed into lilliputian dimensions with an exacting, relentless energy concealed under childlike smiles. The children, who love the garden, feel only its beauty; but older persons cannot forget its esoteric significance. A thousand years hence, when every inch of land in America is precious, may not such gardens become one of the leading types, even here?

At present such a possibility seems very distant. The mere increase of Japanese vegetation in its natural forms is wholly consistent with occidental garden ideas. Everywhere one sees evidences that many of the characteristic plants of Japan are becoming naturalized. Among trees I note especially Salisburia adiantifolia, Sciadoptys verticillata and Laurus Camphora, all of which are becoming popular, and the latter extremely so. The Camphor and the lilac-flowered Paulownia imperialis are exceptions to the general rule that Japanese plants only thrive in the Coast Range valleys, for one finds extremely healthy specimens even in the hotter parts of the San Joaquin Valley. I measured a Paulownia-tree not long ago that, having grown two years from seed, and accidentally broken off at the surface, had sent up in one season a stem eighteen feet high and over two inches in diameter. The Paulownia, massed on hillsides with golden Acacias, is in its properly effective place, and southern Californians are beginning to use it on a large scale. Oaks of east Asia are only in nurseries as yet, but Oak planters, who are but few in any generation, are watching them with much interest. The deciduous Magnolias begin to be fairly abundant. One nursery has sold 20,000 trees in the past ten years, including seven or eight species, and now has half an acre devoted to this brilliant spring-flowering tree.

Another pleasant incident is the increased planting of the Bamboos. There is little or no botanical classification as yet, but the common varieties and several good species of Japanese Bamboos are quite often seen in gardens. There is talk of making a tree-lined avenue from San Francisco to San José, nearly forty miles. If carried along the foothills, such an avenue would cross many streams and moist places, where clumps of the hardier species of the giant Bamboo might safely be planted, so as to give what is now an almost unknown effect in the California landscape.

The Japan Maples thrive within reach of the sea air. Superb specimens of all the rich-colored cut-leaved varieties are to be seen in Sonoma, Marin, Alameda, Santa Clara and southward to Los Angeles, but without special care they usually fail to prosper inland. There is no reason why they should not be grafted on stronger-growing native species, and some of the dwarfed plants which come from Japan strike deeper root and become almost trees. To the Japanese gardeners such a Maple must seem a mere monstrosity, and I have seen them look upon one with serious disapproval. They feel much the same way about grafting the pretty little Dwarf Orange, the Oonshiu, on some sturdy standard seedling, where it soon makes a large head and bears fruit of twice the usual size.

Among more brilliant lesser shrubs, the Tree Pæony of Japan bids fair to become a notable California flower. Not that one sees it frequently as yet, but many are planted and growing, and showy masses of them attract much admiration and inspire more extensive planting. The roots are usually somewhat expensive, though I have sometimes seen good collections of fifty named varieties sold for $25.00 per hundred, but this was rather late in the spring, when care was needed to establish them. They bloom early in April, a full month before the herbaceous Pæonies, and in old gardens the plants stand four or five feet high. They are eminently adapted to all parts of the Pacific coast.

Camellias, though grown in houses, are properly outdoor shrubs in most parts of California, and very large importations have been made from Japan. The largest Camellia-tree I have seen brought over was about twenty

feet high, and sold for $300. Around the State Capitol Building in Sacramento are many large and fine Camellia-bushes, and venders of the flowers crowd the legislative halls. It is hard to rank any one of the Coast Range cities as first in the matter of Camellias. San Rafael, Santa Cruz, Santa Barbara and others are brilliant in winter with this classic flower, which is sometimes in outdoor bloom from December to the end of May.

Chrysanthemums, Lilies, Irises and Lotuses are every year more extensively planted in California, and Japanese sources supply a large part of the stock. They are not likely to become in any sense broadly characteristic of California gardens, except as they are grown with especial ease here, and so may usurp a larger share of space. Madame Chrysanthème seems to place her seal on the whole autumn and early winter here, so long is the season of blossoming. Like the willful little woman of Pierre Loti's Japanese novel, she is both a fascination and a disappointment.

Berkeley, Calif. *Charles Howard Shinn.*

Oil of Birch.

IT is not generally known that the Sweet Birch, Black Birch or Cherry Birch, Betula lenta, which is an important timber tree, is also of considerable economic value for its aromatic constituent, the oil of birch. Many of the mountain forests of eastern Pennsylvania and northern New Jersey are abundantly supplied with this Birch. Instead of a tree fifty to sixty feet in height, it is oftener found on the mountain sides as a shrub from ten to twenty-five feet high. In Schuylkill, Carbon and Luzerne counties, Pennsylvania, numerous distillers are located, who manufacture the oil in conjunction with that of wintergreen. The two oils being chemically and physically identical, they are made and sold indiscriminately as oil of wintergreen, teaberry or gaultheria.

During the summer months wintergreen is employed in the manufacture of the oil, since it can then be collected by the cheap labor of women and children, but in winter and spring, when the ground is covered with snow, Birch is used almost exclusively. The distiller locates where he can get good water and plenty of the Birch. The latter is cut when from ten to twenty-five feet in height; the stumps sprout again, and in five to ten years are ready for a second cutting. The trees are hauled or dragged to the distillery, where, by means of a water-wheel and a trip-hammer device, in which one or two heavy knives take the place of the hammer, the trunks and branches are cut into pieces one or two inches in length. The stills hold from half a ton to a ton, and consist of wooden boxes with copper bottoms, and in some cases copper heads also. They are filled to within twelve inches of the top, water is run in to one-third the contents of the still, and after macerating overnight distillation is commenced by means of a wood-fire. The vapor is conducted into a copper or tin worm, placed in a barrel, and kept cooled by a continuous stream of water from a cold mountain stream. The steam is condensed in this coil and issues below as mixed oil and water. The oil in this case, being heavier than water, settles to the bottom of the receiver, which is usually a quart fruit-jar, while the water is conducted off and run into a barrel to be used again with the next lot of wood.

The yield of oil of birch is about four pounds from one ton of the wood—that, is from two-tenths to three-tenths of one per cent. Some distillers state that the yield is greatest in July and August, but in a visit to Luzerne County in 1890 I gathered the impression from those consulted that the greatest yield was obtained in the months of April and May. All agree that very little oil is obtained in October, when the leaves are falling. In the vicinity of White Haven, in the same county, there are from six to eight distilleries that produced in 1890 a total of some three or four thousand pounds of the oil. Since then the artificial oil of wintergreen, made from salicylic acid and wood alcohol, has been placed on the market at such a price as to very much lessen the production of oil of birch. While the artificial oil is not identical with the oils of birch and wintergreen, yet it is so near that only an expert can detect the difference.

The production of the natural oils commenced in Luzerne County about the year 1865, and, as they are preferable for medicinal use, there will probably continue to be a demand sufficient to maintain the industry in its present proportions.

College of Pharmacy, Philadelphia. *Henry Trimble.*

Notes from a Botanic Garden.—I.

IN a very modest way the beginning of a botanic garden was made here in 1877, along a shady bank near the brook and not far from the greenhouses. The garden now under consideration consists of three acres, lying on the north bank of the Cedar River and extending to the north-east on both sides of a small brook. This area does not include the arboretum, nor the greenhouses, nor the adjoining lawn and flower-beds and plats of shrubbery, with their numerous varieties and races. The space of which I now speak consists largely of the higher portion of the river flats, mostly above high-water mark. On the banks are a variety of shrubs and small trees of nature's own planting. The artificial portion of this garden, then, consists mainly of hardy herbs, with a few shrubs—1,200 to 1,500 species. At first, considerable pains was taken to make, by means of bowlder stones, small pockets a foot or two in diameter for each species, but in dry times the small plants wilted, while the woody growth, rooting deeper, absorbed the moisture and thrived. At present, the sloping banks are devoted almost exclusively to the families containing many woody plants, while the herbs have slid down to the low flat land, which most of them seem to like very well.

In this new state and in this utilitarian age at the oldest agricultural college in America, we are still occasionally called on to rise and explain the uses of a botanic garden. I am happy to state, however, that this question has never been asked by people who visited the garden. Inquiries have frequently been made by people from the country, the village and the city; comments without end have been overheard, and with scarcely an exception this "novel sort of a garden" awakens their interest at once. We aim to grow (by no means always successfully) a plat of each species two to six feet in diameter, large enough to fill the eye, that the botanist, the artist, the florist may see how he likes it. Where the piece is rather large there is much less danger of losing the whole than where but little is grown. The farmer can compare some of the newer untried sorts of grasses or other forage-plants by the side of his old favorites, or he can see behind a label containing its name some weed-pest that has lately found its way into his neighborhood. The bee-keeper looks for the plants and their names where honey is gathered in most abundance. The entomologist learns to look for certain insects on the plants of a certain family or species. At a farmers' institute last winter no topic attracted greater attention than the mention of a family of mints represented by some fifty or more species in our botanic garden. Several present expressed a determination to pay the garden a visit for the purpose of looking for something new and promising for distillation. They hoped we would extend the list by introductions from other countries.

Many kinds of pretty wild plants are not well known by people in general, especially since the woods have been cut away or pastured and the swamps drained and placed under cultivation, or frequently burned over. Even along the roadside, in many places the fences have been removed and grasses, grains and potatoes come nearly to the tracks made by the wheels. In the vicinity of college or high-school, the herbarium fiend ransacks the wild places for

choice plants, which he removes, root and branch, in large numbers. Sometimes the roots are removed to supply the eastern market. By these methods the choicer plants are driven farther and farther over the hills or back into remote swamps and small patches of forest.

A botanic garden of some extent is now becoming almost a necessity for supplying students of school or college with suitable materials for illustration and study. At this college, where the academic year includes the summer months, a garden is especially valuable. Here each student may find suitable plants for the study of fertilization by insects; or a comparison of the tendrils, the runners, root-stocks, a study of various twining plants, or almost anything needed for a thesis in botany, or for making notes to present to the botany club or natural-history society. Every little while the amateur or the professional florist has his attention called to the peculiar value of some aquatic, climber, shrub, or what he supposed was nothing but a weed. He adds it to his garden. These benefits of a botanic garden are not yet fully appreciated, though ours is a favorite place for young students from neighboring schools. Until seen in their prime, no one can imagine the different shades of color, the various forms in general outline and in detail, and the endless number of positions assumed by stem, leaf, inflorescence, bud and flower.

No one learns so much from the garden as the person who selects, arranges and cares for the plants. He is both student and experimenter, and the more he learns the better it will be for his pupils. At one time he is nearly outwitted by the moles that undermine his favorites of the dry, sandy knoll; at another it is the plant-lice on the wild Asters or Water-lilies, the blister-beetles coming in great swarms to strip the Lupines, Coffee-trees or Baptisias, or, again, it is the muskrats which devour the root-stocks of the aquatics, or the striped squirrels which feast on the Putty-root. He finds that June freshets decimate some plants not accustomed to long inundations in time of growth. Among such are Spikenard, Ginseng, Adder's-tongue, Burdock, Dandelion, Catnip, Motherwort, Wild Lettuce, Mayweed, Mallow, Plantain and many more.

Some fifteen years ago plants of Marsilia quadrifolia were introduced into one of the ponds, and soon spread all around it and sent forth long stems into the water where it was two feet deep or more. For some feet near the shore the surface of the water was covered with these beautiful leaves. Then water-snails, finding plenty of suitable food, multiplied, and the Marsilia retreated to the shore in a few spots in the grass, awaiting better times. We still grow it well in the mud a few inches above the water. Last winter the thick ice during a long cold, two months or more, killed the snails as well as the fish, and this summer the Marsilia has again invaded the water. Wild Rice in like manner was kept in check by the snails, but this year it grows in water two feet or more in depth.

Agricultural College, Michigan. *W. J. Beal.*

Foreign Correspondence.

London Letter.

Æschynanthus Hildebrandii.—This is a charming little plant, a veritable alpine, with all the attributes of the pigmy beauties of the rock-garden, such as Gentian and Androsace. It is quite happy when grown in a cold greenhouse, forming compact tufts of stems three inches high, clothed with green ovate fleshy leaves an inch long and a terminal cluster of four or more bright scarlet and crimson flowers, each an inch long, with the upper segments united and forming a hood, the one lower segment being turned down and suggesting a well-protruded tongue. The figure in the *Botanical Magazine* (t. 7365) does the plant scant justice, but it was prepared from a specimen which flowered in a stove. Mr. Hildebrand, of the Shan States, Burma, after whom this species was named, and who sent seeds and plants of it to Kew last year, says that on the high hills in Burma it forms dense tufts on the trunks of trees in very moist situations, and when in flower it looks like a cushion of scarlet velvet. It is certain to find general favor.

Crinum augustum.—The finest specimen I have ever seen of this grand Crinum is the result of novel treatment, for a Crinum at any rate. Three months ago Messrs. F. Sander & Co. presented to Kew a bulb of an unnamed Crinum of extraordinary size, being nearly two feet long and eight inches in diameter. It was planted in a twelve-inch pot and half-submerged in the water of the tank in which the tropical Water-lilies are grown. Here it started into vigorous growth, and it now has about a dozen leaves, some of them being three feet long by six inches in width; it also bears a stout scape three feet long, with an umbel of forty flowers and buds; each flower is eight inches across from tip to tip of the elegantly recurved segments, the color is rich crimson outside, paler inside, and the odor is powerful and delicious. A second scape, quite as strong as the first, is rapidly pushing. We have no more attractive plant among the many specimens cultivated.

Hedychium angustifolium × Gardnerianum.—The Hedychiums are happiest when grown in very large pots of rich soil and partially submerged in the water of a warm tank in an unshaded house. At Kew this treatment is followed for a selection of the best of the species and several hybrids raised about ten years ago in the Edinburgh Botanic Gardens. The finest of the latter is that named above. It has erect stout stems five feet long, clothed with dark green leaves a foot long and terminated by an erect spike, nine inches long and four inches through, of rich red, almost crimson flowers. Another handsome hybrid is a cross between H. Gardnerianum and H. coronarium, which has all the fragrance and delicacy of flower of the latter, with the shorter, sturdier stems and free-flowering nature of the former parent. Growers of tropical aquatic plants will find these Hedychiums excellent companions to Nymphæas, Nelumbiums, Papyrus, etc.

Begonia carminata.—The shrubby evergreen species of Begonia are now receiving attention from hybridists, and we have already some very beautiful hybrids, namely, President Carnot, Paul Bruant, Diadem, etc. Messrs. J. Veitch & Sons have added another by crossing the elegant, richly colored B. coccinea (corallina) with B. Dregie, an African species, with deciduous stems and a fleshy potato-like tuber. The hybrid has a good deal of the habit of B. coccinea, the branches being semi-drooping and the leaves wavy and lobed. The flowers are borne in large drooping, branched umbels, and they are colored rose-carmine. Although the plants shown were small, they were well flowered, a character inherited from B. Dregie.

Primula imperialis is at its best now in a cold greenhouse at Kew. The leaves are a foot long and three inches wide, the flower-spikes three feet high, each with five or six crowded whorls of deep yellow flowers. We find that this species is practically biennial; at any rate, we have not been successful in keeping any of the plants after they have flowered, and they flower in about two years from seeds. They ripen seeds freely under cultivation. Although coming from such a high altitude on the Java mountain, where severe frost is experienced, this Primula will not live out-of-doors through the winter at Kew. The best position for it is in a house where Masdevallias thrive, or it may be grown along with the greenhouse Cinerarias. We have seeds ripening on a plant of P. Japonica, fertilized with pollen from P. imperialis, an interesting cross.

Hemerocallis aurantiaca is the name of a distinct-looking, handsome Day Lily which was awarded a first-class certificate this week by the Royal Horticultural Society. It was shown by Messrs. Wallace, of Colchester, who obtained it from Japan, where it is said to have been found wild among Iris Kæmpferi. In stature and general characters it resembles H. fulva, but the flowers are six inches in diameter and of a uniform deep yellow color. Mr. Wallace thinks it may be a variety of H. fulva (disticha), but Mr. Baker considers it a fine form of H. Dumortieri. Whatever

its affinity, it is a handsome addition to the cultivated Hemerocalli, which are among the most useful of all hardy Liliaceæ. H. flava is satisfactory when grown in pots for the conservatory.

SENECIO MACROPHYLLUS.—A large specimen of this noble Caucasian species is now the most striking plant in the herbaceous garden at Kew. It is a tuft six feet through, formed of erect spathulate leaves three feet long and a foot in width, glaucous-green, with a whitish midrib and denticulate margins. The spikes, of which there are twelve, rise erect to a height of six feet, and they are sturdy enough to support themselves in the roughest weather.

Fig. 42.—Yucca macrocarpa.—See page 301.

The flowers are crowded in a branched raceme over a foot in length and six inches through, their color being bright golden-yellow. All through the hot dry weather of the last six weeks this plant has been an attraction, and it promises to keep on for some weeks longer. I have never seen this species anywhere except at Kew, where, however, it has been grown in its present position for at least fifteen years. It is a noble plant in every sense. Another name for it is Ligularia macrophylla.

ARNEBIA CORNUTA.—This pretty annual was introduced to Kew from Afghanistan seven years ago by Dr. Aitchison, when it was figured and described in various publications, notably in GARDEN AND FOREST, vol. i., page 6. It was shown in flower this week at the meeting of the Royal Horticultural Society and obtained a first-class certificate. It is taller and larger in all its parts than the older Arnebia echioides, the Prophet flower, and the flowers are richer in color. The singular character of changing color, observable in the flowers of the latter species, is possessed by A. cornuta. It should be sown in pots or boxes in a frame in February and planted outside in light rich soil in June. There are plants of it in flower now in the border at Kew.

London. *W. Watson.*

Plant Notes.

STENANDRIUM LINDENII.—This is one of the most effective plants that have been introduced for years. It is of a low, trailing habit, but the stems are short and fleshy, forming a compact mass of leaves. Like so many other fine-leaved plants, it belongs to the natural order Acanthaceæ. The flowers are insignificant, yellow, borne on close-bracted spikes, and look neat, but not showy. The leaves are obovate in outline, of a rich velvety green, with yellow variegation along the veins. This is a useful plant for vases and window-boxes, and will probably in time prove effective for bedding. Propagation in brisk bottom-heat is comparatively easy; cuttings will root in ten or twelve days. The young plants will grow best in a rich vegetable soil with plenty of sand.

STIGMAPHYLLON CILIATUM.—We have more than once invited attention to this plant, but it is worth repeating that it ought not to be neglected by any one who is looking for a reliable climber that will grow anywhere—in a greenhouse or in a parlor. It is very free-flowering even when small. The yellow flowers are about an inch and a half in diameter; the five petals, with undulate fringed edges, are elliptical, or sometimes kidney-shaped, and narrowed to a long claw at the base. The inflorescence is in few-flowered corymbs. The opposite leaves are heart-shaped, with a ciliated edge and a satiny surface, and are borne on short slender petioles. The slender twining stems grow to a considerable length. The foliage is abundant and quite ornamental. The plants thrive in a rich fibrous soil in a warm sunny position, and require generous watering, and they will do very well in comparatively small pots, although when they have abundant root-room they will be more vigorous and floriferous. In color and form the flowers suggest those of an Oncidium. It is practically ever-blooming, but when cut back hard in autumn it will flower on the young shoots abundantly all summer. It is propagated from cuttings in bottom-heat.

SMILAX ARGYRŒA.—Since the introduction of the beautiful, but now exceedingly rare, Smilax ornata no climber of this genus has been cultivated as a greenhouse climber. The present species is somewhat different in habit, altogether more promising, and probably a plant of lasting value. The leaves are longer than those of S. ornata, eight or ten inches when fully developed, lanceolate, abruptly ending in a short petiole, with three principal, equidistant and almost parallel veins. The texture is somewhat leathery, and the color a fine silvery gray, with deep green blotches. The stem is very wiry and slender, twining and climbing by means of long tendrils and short stout thorns. As it is a robust healthy grower, doing well in a moderate temperature and forming very ornamental specimens quickly, this plant will probably be very valuable. It looks best trained on a globular or conical frame of wire. It is propagated from half-ripe cuttings taken from slender side-shoots with two or three eyes, and inserted in a moderately warm bed. The soil should be rich and fibrous, as for all plants of its class, and the position light and sunny.

MALOPE MALACOIDES.—This is a charming old-fashioned annual plant, a native of the south of Europe, which is not

now very often seen in our gardens, although it is easy to cultivate and the flowers are very beautiful, with clear pink corollas three or four inches across, marked within at the base with purple longitudinal stripes; they are solitary on long stems from the axils of the leaves, and keep on appearing from the end of June through the summer, or as long as the plants continue to grow. The leaves are oblong-ovate, crenate, wedge-shaped at the base and long-stalked, and in rich well-drained soil the plants will grow to the height of about two feet. Although, perhaps, most attractive on the plants, which should be used in masses, the flowers last a long time when cut, and are well suited to arrange in vases.

Iris Japonica.—This Iris, also known as I. Chinensis and I. fimbriata, is valued, wherever known, as a very attractive greenhouse perennial. It has been in cultivation about a century, but is still a plant too seldom seen, especially as it is attractive in leaf as well as flower. The dark green leaves are sword-shaped, somewhat lax, and borne in fan-shaped clusters. The plants usually flower in early spring on stems as long as the leaves, and these, with the many heads, form a true raceme. The individual flowers fade with the day, but are quickly succeeded by others from the three or four flowered spathes. They are very beautiful; the color is a delicate light blue, with orange-yellow crest and markings of the same color on a white ground on the falls. This ground is bounded by a row of lavender lines and dots, which are darker in hue than the body color. The segments are also beautifully fimbriated on all the edges, and are spread out Moræa-like. The style crests are also deeply cut and fimbriated. The cultural requirements of this Iris seem to be the growth, from flowering time, in open, rich soil, with some peat and sand and good drainage, in order to produce well-matured plants in the early year.

Bravoa geminiflora.—This twin-flowered Amaryllid is a tuberous-rooted plant from the mountains of central Mexico. As it occurs at high altitudes it would probably be hardy here with slight protection. It has narrow leaves one and a half feet long, and flower-spikes six inches to a foot longer. The flowers are borne in distant pairs on opposite sides of the stem. They are an inch long, narrow, trumpet-shaped, and orange-red in color. They are drooping and show little of the lighter inner color which the protruding anthers also serve to hide. This plant is interesting rather than showy or ornamental.

Pinus Koraiensis and P. parviflora.—Pine-trees small enough not to outgrow, without continual mutilation, the limits of a small lawn are not very numerous, although there is a demand for such plants to take the place of large trees, like the Austrian Pine and the Norway Spruce, which are often planted in spaces only a few yards square, and, of course, have to be rooted up long before they reach half their natural size. There are, however, two small Pines from north-eastern Asia which are well suited to decorate small lawns in this country, and it is a pity that they are so little known and so rarely planted. They are Pinus Koraiensis and P. parviflora, species with five leaves in the leaf-cluster, like our White Pine, short cones with thick scales, and large edible seeds. P. Koraiensis is usually not more than thirty feet high when fully grown, and forms a broad round-topped cone, with its lower branches resting on the ground. The leaves are pale green, and as they do not fall until the end of three or four years, the appearance of the tree is more leafy and much denser than many of the other White Pines which lose their leaves much earlier. This density of foliage and the light orange-red color of the young shoots distinguish this Pine, and make it an exceedingly attractive object. It is very hardy as far north, at least, as New England, and there are already several specimens in this country from twenty to twenty-five feet in height. As its name implies, P. Koraiensis is a native of the Corean peninsula, where it is said to be abundant, as it is in the Manchurian coast regions. Like several other trees, it was carried to Japan nearly a thousand years ago by Buddhist priests, and is still occasionally planted in their temple gardens. From these cultivated trees the species was first described and figured by Siebold and Zuccarini in their *Flora of Japan*.

Pinus parviflora is a somewhat larger tree; it grows sometimes on the mountains of northern Japan to the height of sixty or seventy feet, overtopping the forests of deciduous trees with its handsome head of long graceful, somewhat pendulous, branches, and relieving the monotony of the sky-line just as our White Pine stands like a sentinel over the sylvan landscape of eastern America. The leaves of P. parviflora are short, silvery white in color, and much clustered on short branchlets springing from the long flexible branches, which form broad distinct whorls about the stem. There are specimens of this tree in the eastern United States about twenty feet high which are every year covered with cones, but they show no disposition yet to produce the tall naked trunks found in the Japanese forests, and still retain their lower limbs. These are shorter than some of the more vigorous branches above them, so that the shape of the young tree is obconical and very irregular, the branches on one side sometimes growing much longer than those on the other. This Pine is able to resist the most severe cold; it is extremely picturesque in habit, which in its young state is entirely unlike that of any other Pine-tree, and it is delightful in color. The cones, however, which are produced in profusion and turn nearly black after the seeds are shed, do not fall for several years, and somewhat disfigure the appearance of the tree, which is otherwise one of the most satisfactory of all the conifers of moderate size that can be grown in the northern United States.

Cultural Department.

Air Drainage in Orchards.

THE presence of a large body of water is a protection to orchards, but only while it is open water. As soon as it is sealed by freezing it is no longer a protection; and as rivers and lakes occupy depressions in the earth's surface, their immediate vicinity is subject to a lower temperature than more elevated territory, in consequence of what is popularly called the setting of the cold air into the lowest spots. The realization of this fact came to me slowly. My "Old Place" is close to Lake Memphremagog, which is a decided protection against frosts so long as the lake remains open; yet I learned that on the surrounding hills some varieties of Apples, and even a few Pears, could be successfully grown, which, with me, were destroyed by the test winters.

In the six years that I have been in possession of an upland farm, two to three miles from the lake, I have had an opportunity to note these facts more fully, and to study the subject more thoroughly. In the country about Lake Champlain, the deeper parts of which often remain unfrozen nearly all winter, the Baldwin Apple is grown with success, though with some risk of injury to the trees in abnormally cold winters; but Lake Champlain lies nearly a thousand feet lower than Lake Memphremagog.

The efforts which have been made in the past thirty years to extend orcharding into the mountain regions of this state have been costly; but by patience and perseverance, and by the introduction of the tree-fruits of Russia, the principal difficulties have been measurably overcome. Still, as yet, very few of our orchardists fully understand this matter of air drainage—the fact that low valleys are colder when it is cold, as well as warmer when it is warm, and the consequences which follow therefrom. Not only do we lose more trees by winter-killing in the valleys, but in time we find that even the hardier trees, which are not killed, and for some time are apparently not injured, are gradually weakened, and thus decline in thrift and vigor. This decline is becoming more and more manifest as time passes, and it tends more and more to push orcharding back into the hills. Antagonizing influences, however, are found in the fact that the hill farmers—with exceptions, however—have commonly less capital, less confidence in fruit-growing, and are farther from the markets and from transportation facilities. The last obstacle, however, will, I believe, be soon overcome by branch lines of railway, of narrow-gauge and cheap equipment, with electric propulsion

cheaply supplied from the abundant water-power of our mountain lakes and streams. These will be rapidly constructed, to the great advantage of our hill farmers.

It is important that the facts above noted should be widely known, because such knowledge will materially aid in the selection of suitable sites for orchards, where the trees, carefully cared for, may be expected to survive and yield a profit to those who plant them for a long series of years. Pioneers like myself, having nearly reached the limit of human existence, can only hope to aid, by their long experience and many mistakes and failures, to make the way easier for those who will come after them. That our northern border states will hereafter yield an increasing supply of tree-fruits to the markets of the country can no longer be doubted. But this will not be achieved without careful study of all the conditions, which must be carefully allowed for.

Newport, Vt. *T. H. Hoskins.*

Cupheas.

THE genus Cuphea contains a number of showy perennial and annual plants. Some of the evergreen perennial species are quite well known in gardens, but the annuals are seldom seen outside of a botanic garden. The perennial species are very easily raised from cuttings made of the young growth in March or April. If the cuttings are inserted in a propagating-bed in clean sharp sand, with a good bottom-heat, they root in about two weeks. When rooted they should be put into two or three inch pots and then placed on a hot-bed, where they soon make neat dwarf bushy plants. About the middle of May they may be planted out into the beds, where they will flower all summer; in fact, we can hardly ever find them without flowers. When there is danger of frost in the fall some of the plants should be potted and put into the greenhouse, where they bloom all winter. From these plants we raise our stock for the following year.

The annual species are very interesting, and some of them are showy when in bloom. They are raised from seed, which is sown in April, and the plants are grown along until May, when they are planted out. They soon begin to blossom, and continue flowering until they are destroyed by frost in the fall.

Perhaps the best-known perennial species is Cuphea ignea, which is also often found under the specific name, platycentra. It is a neat half-shrubby plant eight to twelve inches high, and its stems are thickly set with opposite, nearly glabrous, glossy green, lanceolate leaves. The plant bears a profusion of flowers, which are produced between each pair of leaves. The tubular apetalous flowers are about one inch long, of a bright scarlet color, and have a black and white expanded limb. This Cuphea is well adapted for small beds in the flower garden. It is a Mexican plant, and was introduced here in 1845. The common name of this plant is the Cigar-plant.

Cuphea lanceolata is a hispid, clammy Mexican annual, which grows about one foot and a half high. Its stems are thickly covered with long brown clammy hairs, and are clothed with opposite oblong-lanceolate leaves, which taper at the base into short petioles. The flowers of this plant are rather large and showy, and are in racemes on the branches. The calyx is of a purplish color, about one inch long, and the petals are bluish, the two upper ones being the largest and showiest. This plant begins to flower when not more than six inches high, and keeps on blooming until late in the fall.

The Clammy Cuphea, C. viscosissima, is an annual, found growing in sandy fields from Connecticut to Illinois. If conditions are favorable for its growth it will soon attain a height of two feet. It is curious that this is not numbered among insect-catching plants. A small branch a foot long now before me has no less than eighteen small insects captured on its clammy hairy stem. It is a branched plant with alternate branches and opposite leaves. Its flowers are of a rich purple-violet color, and when massed together they are very showy.

Cuphea hyssopefolia is a dwarf perennial from Mexico, which is grown in the greenhouse in the winter and used in the summer for borders of small beds. It is about six inches high, and its stems and branches are thickly covered with small linear oblong leaves. The flowers, although small, are plentiful, and are of a pinkish color.

Another Cuphea in bloom now is C. mimata. It has pale vermilion solitary flowers, which are abundant until October. The height of this Mexican annual is about two feet.

The showiest Cuphea in bloom now is C. Llavea. It is a perennial species that was introduced from the mountains of central Mexico in 1830. Its flowers are large and showy, and are in few-flowered short racemes. The two large petals are the showiest part of the flower, and are of a deep red color. This Cuphea grows about a foot high, and it makes a neat bedding-plant, with plenty of flowers all summer.

Harvard Botanic Garden. *R. Cameron.*

The Flower Garden.

PERENNIAL plants especially have reveled in the recent showery weather and have made rampant growth. The increasing popularity of old-fashioned hardy plants is more evident each year; less carpet-bedding is seen, and where tender plants are largely used mixed tropical beds or beds of flowering plants, as Cannas, are replacing the formal, and often grotesque, color designs.

At this season the perennial borders are well filled, and not much bare ground is seen. Many of the taller-growing sorts, such as Helianthus, Rudbeckias, Heliopsis and Asters, will need to be securely staked for protection against wind and heavy rains. Many plants which have finished blooming should have the old flower-heads removed before the seed ripens. Some plants like Papaver orientale are little better than noxious weeds if their seeds are scattered over the borders. This is a good time to make note of the heights of various plants and to mark for removal in the fall those not properly placed and any which may be overcrowded. Weeds must be kept down by the hoe or by hand. They often grow inside the clumps of flowering plants, and can only be removed by hand.

A sowing of Pansies may now be made. We use a frame with a northern slant for this purpose, and keep it shaded until the seedlings appear. Trimardeau and Bagnots proved the best of several strains tested this season. Hollyhocks should also now be sown. With slight protection these stand the winter here, but we keep a number in four-inch pots in a cold frame and plant them out in the spring to make certain of a crop. Seeds of Sweet William, Canterbury Bells, Digitalis, Antirrhinum, Wallflowers, etc., are now showing above ground, and when large enough to handle will be pricked off in a nursery-bed. Antirrhinums make capital winter-blooming plants, and a number of these placed in five-inch pots in October and held in a cold frame until the new year will prove useful in the conservatory later on.

Cannas are benefited by having the seed-pods removed as they form. These are the foremost tender bedding plants, as their increased cultivation testifies. The following are the best sorts now in bloom here: Madame Crozy, Alphonse Bouvier, Queen Charlotte, F. R. Pierson, Gloire de Montet and Eldorado. The first two kinds are still the best we have. Tuberous Begonias require staking where they have made good growth. A mulching of well-rotted cow-manure and plenty of water, with partial shade, are essential to their successful cultivation in the open. Geraniums should be gone over once a week and decaying flower-stems removed. Nothing spoils the appearance of a Geranium-bed so much as the neglect of this simple operation. Coleus, Stevia, Achyranthes and similar plants with colored leaves, as also Alternanthera, Santolina and other carpet-bedding plants, now make rapid growth, and a good deal of pinching is required. After heavy rains the hoe should be used to loosen up all bare ground. Grass verges need cutting weekly during weather such as we have lately had. A flower-bed loses half its beauty if the verges are not well kept.

Sweet Peas are helped by an occasional soaking of liquid manure, and it is best to give this after heavy rain. Seed-pods should not be allowed to form if a prolonged blooming season is desired. A good syringing on the evenings of hot days helps to keep down red spider and refreshes the plants. Our latest batch of Stocks and Asters has just been planted out. These are kept well watered; if allowed to become dry, aphis usually attacks the plants and ruins them. We have found watering with moderately strong tobacco-water the best remedy for this foe. A sharp lookout must be kept for the black Aster beetle, which usually makes its appearance with the first flowers. Killing by hand is the only safe remedy we know of for these destructive pests. Dahlias now require stout stakes well driven into the ground and should be looked over every ten days. After the main crop of roses is past the beds usually receive scant attention. Seed-pods should be removed, and if the plants are budded on the Briar, Manetti or De la Grifferaic stocks, suckers from these are sure to appear here and there and should be rubbed off or cut out. Marguerite and summer-flowering Carnations of the greenhouse kinds are now flowering freely. A little chemical fertilizer scattered between the rows and hoed in will be found helpful, and watering in dry weather is essential to success.

Taunton, Mass. *W. N. Craig.*

The Rock Garden.

THE rock-garden in summer, like the herbaceous border, will appear ragged if not carefully gone over every week or two. There are two important overhaulings during a season. By the one in early spring some valuable lessons are learned, especially on the hardiness or non-hardiness of the newer additions; and, again, in summer the garden is improved by reducing the number of some kinds of plants, and the transplanting of seedlings and other plants from the reserve garden.

Campanulas are abundant, so that blue is the prevailing color. C. Carpathica, in several fine varieties and allied forms, is growing luxuriantly, including the beautiful C. Carpathica turbinata and the pure white-flowered variety. C. Van Houttei is probably the largest bell-flower of all. There are also C. latifolia macrantha, C. Pallasii, self-sown to the extent of needing continued weeding out; C. Garganica, the most diminutive, with clusters of pale blue. The dwarf Chinese Bell-flower, C. grandiflora pumila, better known as Maresii, belongs to the Platycodon section of the genus, and is distinguished by the spreading segments of the corolla, rather than by being bell-shaped. I measured one flower recently which was three and three-quarter inches across. The new Ostrowskia magnifica must belong to this group, judging from flowers seen recently at the Bussey Institute. There is also the white C. alliariæfolia, which, though rather coarse in habit, is quite handsome when in flower; the white C. persicifolia and the distinct C. glomerata Dahurica. A few noble spikes of a hybrid Cardinal-flower contrasts beautifully in color, helped by the charming little Slipperwort, Calceolaria Mexicana, which here is a hardy annual. The copper-toned Poppies, Papaver pilosum and P. rupifragum, biennial in character, almost bloom themselves to death, and bright little patches of Sea Pinks still linger on. Sempervivums and Sedums, in crevices and ledges along the paths, are especially attractive at this season. Sedum acre shows dense masses of yellow flowers; S Kamtschaticum has paler flowers of the same color, and S. lydium charming pink blossoms. S. Hispanicum has glaucous foliage, S. sexangulare deep green, and S. Anacampseros rosettes of broad glaucous leaves on stoloniferous stems. Several Sempervivums are handsome in their flowering as well as in the neat rosettes of many shades of green. S. arachnoideum, the cobwebby Houseleek, is the most peculiar of all; S. arenarium has small globular rosettes of light green tinted with brown. S. calcareum is abundant in several forms, and also S. Atlanticum. Several species of Dianthus light up the rock-garden. D. hybridus is among the handsomest, having deeply fimbriated petals. D. dentosus, the Russian Pink, is a brilliant red; D. cæsius and D. arenarius complete the list.

Wellesley, Mass. *T. D. Hatfield.*

The Tussock Moth, Orgyia leucostigma.

SO much has been said in Boston about the difficulty and expense of keeping the larvæ of the Tussock moth in check that we have asked Dr. E. B. Southwick, entomologist of the Central and city parks of New York, to give us an account of his experience with this insect. Dr. Southwick says:

First, the trees must be cleaned of egg-masses of the Tussock moth during the winter, for each mass of eggs will average between three and four hundred, and, when hatched, the larvæ will feed upon the young foliage in spring. This can be done more readily with steel brushes than is generally supposed. If this has not been done, the second thing to do is to spray the trees in the spring as soon as the caterpillars show themselves, while they are small and in colonies, spraying only those spots that are affected with London purple, and not attempting to spray the whole tree. By these preventive measures of careful watching and spraying in time the Tussock moth can be kept in subjection.

If it is too late to do this and the insects have defoliated the tree, the third thing is to jar down the larvæ with poles covered with rubber, so that the branches will not be bruised. A slight sudden jar will dislodge them, and they will fall to the ground. Two or three men should go ahead and jar them down, and let the spraying machine follow. As soon as they begin to ascend the trunks, spray them with an emulsion consisting of kerosene, six quarts; crude carbolic, four quarts; soap, six pounds, boiled together and mixed with one hundred gallons of water. Sprayed upon the larvæ, this emulsion will kill them. As fast as they come in from the grass and collect on the tree-trunks return and spray them again. This should be done three or four times, when nearly all the larvæ affecting the tree will be destroyed. If this cannot be done, and the larvæ have come to the trunk and branches and formed their cocoons, as is the case with those in Boston now, the fourth thing to be done is to spray the cocoons with the same emulsion, and all that have not left their cocoons will be destroyed, and many of the eggs. With an extension pole, such as I use, one can reach fifty feet or more, and as most of the cocoons are on the under side of the branches they can be easily sprayed. I find that the Nixon nozzle is the best for this work, as it has great penetrating power and throws the spray through the thinly constructed cocoons of Orgyia leucostigma, while the Cyclone nozzle is, perhaps, the best for spraying the foliage. After spraying the cocoons they can be removed with steel brushes if deemed unsightly, or they can be left on the trees. As the spray will kill but few of the eggs, it is necessary to do the spraying before the female emerges and deposits them. If this has not been done, and the trunks are sprayed as the young larvæ hatch, every one of them will be destroyed. At a certain time the trunks of the trees infested with eggs will be covered with minute caterpillars. A practiced eye can tell just when this is occurring, as the egg-masses have a broken appearance and are pierced with holes when the larvæ have emerged and taken their first meal, perhaps. To spray the trunks then will destroy every larva touched.

I find that even if the cocoons are twenty or thirty deep on the branches the stiff spray will penetrate the entire mass. I have used these methods for the past twelve years and have found them effectual here as far as they could be carried out with a force of two men and one spraying machine for all our city parks. We use an extension pole devised for this purpose. The first pole is one and three-quarter inches in diameter and sixteen feet long. The second pole is one and one-fourth inches in diameter and eighteen feet long. The third is a bamboo pole bound to the top of the second one, and is eighteen feet long. The second pole has two rings or bands at its base to run up and down on the first, and is hoisted or lowered by a small rope and pulley. The hose is a quarter-inch orifice rubber-cloth insertion, which is strong and light.

Correspondence.

The Good Work of an Improvement Association at Narragansett Pier.

To the Editor of Garden and Forest:

Sir,—A few years ago Narragansett Pier presented the ragged, shiftless look which is only too common in American seaside resorts frequented by large numbers of people. Just beyond it to the southward ran a beautiful line of rocky coast, backed by the pastures rich in the sturdy shrubs and flowers characteristic of the south-eastern New England coast. But its hotels were built nearer to the fine bathing-beach, along a rough road, between which and the water lay neither beach nor real rocks—only a narrow stretch of stony shore, covered for the most part with rubbish and refuse; and back of them spread an unkempt little village. Now it shows few spots which are disagreeable to look upon; in many parts it has grown very pretty, and elsewhere it is neat, at least. Part of the improvement has been due to the building of the Casino between the hotels and the beach and to the excellent care bestowed from the first upon its grounds, and part to the macadamizing of streets and roads and to the increase in the number of private cottages and villas lying along the streets back from the sea. But even four or five years ago much raggedness and roughness were still apparent, and little care was taken to keep the highways in a tidy condition. The influential men among the hotel-owners and summer residents had tried to exert an influence toward the betterment of these conditions, but without much avail until they conceived the wise idea of asking the women also to exert themselves. A ladies' improvement association was formed, and, although it has existed only three or four years, the good it has accomplished is remarkable. Among its members are owners of summer cottages, constant frequenters of the hotels, and also native residents of the village. The annual fee has, for obvious reason, been kept at a low figure—two dollars; but voluntary contributions are welcome, and have more than once been generously made, and money-making entertainments have been organized from time to time. The largest outlay of the association has been a contribution of $500 toward the building of a fine sea-wall along the ugly stretch of coast in front of the hotels. This, the most conspicuous improvement which could possibly have been made at the Pier, is now completed

for more than half its length. Each season a man is hired by the association, whose duty it is to patrol the streets and keep them clear of papers and rubbish; with this same end in view large strong baskets, painted green, have been attached to fences and posts at frequent intervals, and I have found these baskets constantly well filled with things which, but for their presence, would have littered up the roads and walks. But, say the members of the association, its greatest utility has been a moral one, as stimulating the individuals who belong to it, and, through their example, all the residents of the Pier to keep their private grounds more carefully and to adorn them with plantations. And certainly the combined results of its various efforts seem strikingly great to one who now revisits the Pier after an absence of several years.

Once there was scarcely a tree to be seen except a few Willows. Now very many have been planted, and the cottages are draped with Japanese Ivy, Wistaria, Rose-bushes and Honeysuckles, all of which grow luxuriantly in this climate. Japanese Roses are frequently seen, but it is a pleasure to notice that the common Wild Roses of the region are likewise profusely used for the decoration of the summer visitors' houses. Their grass, and that around the hotels also, is now beautifully kept; and, as a rule, a taste much more commendable than that generally revealed in such places has been shown in shunning so-called "ornamental beds," and trusting to trees, vines, climbers and shrubs for the beauty of small grounds. Privet-hedges are seen in numbers; no plant grows so quickly or does so well as Privet in situations of this sort; and just at this season, when even the most carefully clipped are bursting into profuse blossoming, it certainly supplies as charming a method of fencing villa grounds as could be found.

But the main thing to be noted in the change that has been so quickly worked in this summer resort is not the individual beauty of this plant or of that, or of these grounds or those, but the general improvement in the aspect of the village as a whole, and the fact that it results even more from the neatness newly achieved than from the plantations newly made. It should certainly encourage the formation of similar societies of women in all seashore places where they do not already exist.

Narragansett Pier. *M. G. Van Rensselaer.*

Recent Publications.

Forest Management.—I.

A Manual of Forestry, by W. Schlich. iii. *Forest Management.* London: Bradbury, Agnew & Co. 1895.

The third volume of Dr. Schlich's *Manual of Forestry*, under the title of Forest Management, deals with the preparation of working plans and the gathering of information necessary to that end. The term "forest management," in this country at least, has been held to have a somewhat wider meaning than that attributed to it by Dr. Schlich, and has been taken to include the actual administration of forest-lands. In that sense the "management of a forest" is spoken of, or "forest management" is said to be introduced upon an area of woodland. While the construction and definition of forest terms in the English language is one of the most pressing needs of forestry at the present time, and while there is undoubtedly a gain in clearness under the new meaning, still it is questionable whether the use of the phrase under discussion has not been so firmly established as to make the change difficult, even at the suggestion of so high an authority as Dr. Schlich.

The reason at the root of the utility of a book like the present, which deals exclusively with the methods in use in countries whose conditions, as has been so often said, differ widely from those which obtain in the United States, is admirably described by Dr. Schlich in his preface. He says: "As I have stated elsewhere, the principles of forest management hold good all the world over. In endeavoring to explain these principles it seemed to be right and proper to be guided by the experience gained in those countries which have taken the lead in forestry, namely, Germany and France. In these countries systematic forest management became a necessity almost a hundred years ago, so that their methods are now based upon long experience and a rich crop of investigations."

As a general statement the paragraph just quoted is entirely beyond dispute, and in a text-book for English students it is unquestionably in its place. But even some of the more rigorous principles of forest management, as they are accepted elsewhere, may need modification when they come to be applied in the United States. An example occurs further on in the preface, where Dr. Schlich says: "Economic forestry, to be successful, must be conducted on true sylvicultural principles, and the yield must be so regulated, that, approximately, the same quantity of material may be brought into the market every year; in other words, the principle of a sustained and well-regulated yield must be recognized. Then, and then only, can adequate financial results be expected from forestry." In its application to countries where transportation is less developed and freights are more expensive than in the United States, no exception could well be taken to what Dr. Schlich has said. But with us, where the utilizable part of the wood standing in the forest is usually a comparatively small per cent. of the whole, and where the market of an owner of woodlands in the Alleghany region may cover all the territory from Boston to New Orleans, the reasons for a sustained annual yield lose much of their importance, and in some cases may almost be said to disappear. The single reason which would remain in many instances, were forest management to be applied, would be the necessity for giving continuous work to a trained nucleus for a forest force. Although Dr. Schlich qualifies his original statement when he elaborates it on pages 173–177, in discussing the principles of forest working plans, it still remains true that in many cases, under current economic conditions in the United States, profitable and conservative forest management would not imply anything which could properly be described as a sustained annual yield, and, consequently, would fall outside the definition which the author has given it.

The volume under review is an excellent résumé of the present conditions of one department of forestry in Europe. Concise, systematic, simple in statement and comprehensive in the sense of wise selection, it takes a place which has hitherto been unoccupied. There is nothing else in the same field in English which deserves rank beside it. The criticisms which may be made upon it are to be directed in very great proportion not upon Dr. Schlich's work, but upon the general condition of the science which it summarizes. One of these is called to mind by the fact that, on p. 34, Dr. Schlich rates the proportion of bark, which varies with species, age and locality, at from six to twenty per cent. of the total volume of the tree. Yet, in the calculations made for the purpose of determining the amount of wood standing on any piece of land, and in the yield tables which have been prepared to facilitate it, no allowance is usually made for the bark, while differences of two or three per cent. in the result of the methods used are quoted as matters worthy of attention.

While Dr. Schlich's book is, as I have already said, a summary of the position of one part of the science of forestry in Europe, and more especially in Germany, it is yet written distinctly from the position of one who reserves the right to criticise things as they are. It is preeminently and most successfully a text-book, but it contains here and there discussions of inadequate or imperfect instruments and methods such as are more often found in general treatises. Their value in this place will be to induce the student to think for himself. On the other hand, the details of the methods of working are given with a preciseness altogether German, and, indeed, the whole book is as thoroughly German as is Dr. Schlich himself.

New York. *Gifford Pinchot.*

Notes.

Some of last season's sweet-potatoes are still offered in this city at $1.00 a peck.

The area of the land devoted to the cultivation of prunes in Oregon, Washington and Idaho is already some 50,000 acres.

To exemplify the rapidity with which the Eucalyptus-tree grows in California, a recent writer in the *Scientific American*

says that at New Jerusalem, in that state, one of his neighbors not long ago chopped down a Eucalyptus which he had himself planted nineteen years before. The tree yielded four cords of stove-wood, and it had measured sixty-three feet in height, twelve feet three inches in circumference at the base, and eight feet nine inches at eight feet above the ground.

The grounds of the Berlin Industrial Exhibition, to be held during the summer of 1896, will, it is promised, be exceptionally attractive. Their chief feature will be a large lake formed by the flooding of the present great playgrounds of Treptow Park. A promenade shaded by four rows of Plane-trees now encircles the playground and will form an admirable border for the lake, to create which 48,000 cubic metres of earth must be removed. The water will be pumped up to heights overhanging the lake, whence it will fall into it by means of fine cascades, finally flowing off into the river Spree. But the most interesting feature of the scheme is that the city authorities have stipulated that, when the exhibition is over, the playgrounds must be restored to their original condition, which will necessitate among other things the storing away of the 24,000 square yards of sod which now cover them.

Blackberries are such strong-growing plants that they need a good deal of moisture, and, therefore, the field where they are set should be plowed and subsoiled to a depth of, at least, twenty inches, and every clod should be broken very fine, so that when the ground settles compactly it will hold a great deal of water. *The North American Horticulturist* points out that it is a great mistake to leave off cultivation as soon as the berry season is over, since the pickers will tramp the ground hard, so that the water will evaporate quickly from the soil and the plants will at once ripen up their wood. With the fall rains a new growth will begin, which, of course, will be green and sappy, and unable to endure a hard winter. The best practice is to give frequent and shallow cultivation from early spring until the middle of August or the first of September.

The July number of *The Journal of Botany* contains a biographical notice, from the pen of Sir Joseph Hooker, of Dr. David Lyall, who was surgeon on one of the English men-of-war which, under Sir James Ross, explored antarctic regions from 1839 to 1842. Dr. Lyall died last March, in his seventy-ninth year, after a long service as medical officer and naturalist in the navy. Thirty years ago he was surgeon to the Land Boundary Commission, under Sir John Hawkins, that surveyed the boundary line between British Columbia and the United States. It was on this expedition that he discovered the rare alpine Larch-tree bearing his name, which is thus made familiar to students of American trees. The scientific results obtained by Dr. Lyall on this expedition are published in an important paper in the seventh volume of the *Journal of the Linnæan Society*. This contains an excellent botanical account of the regions between the coast and altitudes of eight thousand feet in the Rocky Mountains, in which the various zones of vegetation in British Columbia are indicated and scientifically portrayed.

The forty-seventh volume of *The Garden* is dedicated to Edouard F. André, the distinguished French landscape-gardener and the editor of the *Revue Horticole*. The dedication, which is accompanied by a portrait, contains an interesting sketch of his useful and laborious career, setting forth in detail the vast amount of scientific, literary and artistic work which Monsieur André, who has only just passed his fifty-fifth year, has already accomplished. A practical horticulturist who for several years directed the horticultural works of the city of Paris, an accomplished scientific traveler in tropical regions that before his time were practically unknown to the botanist, an excellent botanist with an unrivaled knowledge of cultivated plants, a designer of most of the important parks, public and private, that have been created in Europe during the last thirty years, an excellent and faithful journalist, Monsieur André has distinguished himself in all these varied fields of intellectual and physical activity. Still as energetic as ever in the development of his artistic and scientific career, and with every prospect of many more years of usefulness before him, it is pleasant to know that his eldest son, a distinguished engineer, is following faithfully and successfully in his father's artistic profession.

Experiments have shown that mild currents of electricity may have a beneficial effect on the growth of plants, but, of course, a heavy charge will kill a plant just as lightning will kill a tree. Professor Dolbear, in the current number of *The Cosmopolitan*, says that this quality of the electric currents has been used to destroy weeds that grow by railroad-tracks and on adjacent embankments. Without explaining the apparatus particularly, it is said that a metallic strip behind the car stretching across the track a short distance above the ground, is provided with many fine wires, which hang from it like the loose teeth of a rake. Through these teeth the electricity is discharged as the car moves forward, and every weed touched by a live wire receives a deadly current which traverses the roots to their very tips and kills the plant outright. Very evidently a similar plan can be used for ridding cultivated fields of Daisies, Chicory or other plants when their stems reach above the grass about them. A two-wheeled vehicle, like a horse hay-rake, carrying a battery, could be driven across a field so as to kill every plant with which the metallic conductor should come in contact. In this way acres of valuable land could be rid of coarse weeds in a day, with the assurance that no plant fairly struck would ever start into life again.

In the fifty car-loads of California fruits sold here last week were Egg, Columbia, Quackenbos, Magnum Bonum, Bradshaw, Burbank and Bulgarian plums. Peaches from California are as yet neither plentiful nor showy. Nectarines from the Pacific slope sell for $2.00 to $2.50 a crate, wholesale, and the best Bartlett pears average $2.00 a box. Large quantities of peaches continue to come from Georgia, as many as sixty-two car-loads reaching this market in two days. The best peaches now seen here are some large and handsome Elbertas from that state. Troth, York and Rivers peaches are already here from Maryland and Delaware, and a few premature ones from New Jersey. There has been a glut of apples and pears owing to the shipment of large quantities of windfalls and immature fruit, and prices for choice hand-picked apples and pears have suffered in consequence. Summer pippins of the highest grade have brought but $1.25 to $1.50 a barrel at wholesale, and Red Astrachans but sixty cents a crate. Le Conte, Bartlett, Jargonelle, Catherine and Bell pears are abundant, and cost from seventy-five cents to $2.00 a barrel. Moore's Early grapes from the Carolinas sell for fifteen cents a pound at retail, fancy Delawares commanding higher prices. No grapes from California are yet in the market, although a small shipment of a seedless grape known as the Coverley was sent from Palm Springs about the middle of July. This is a little tropical valley on the edge of the great Colorado desert, about one hundred miles east of Los Angeles, and the grape is small, sweet and firm enough to bear transportation well. It grows in large clusters and makes a fine appearance, and a recent dispatch to the New York *Tribune* says that it is rapidly coming into favor as an early market grape in southern California. Red and black currants, raspberries, blackberries and huckleberries are abundant, and cost from ten to fifteen cents a quart.

One of the most famous of the beautiful Renaissance villas of Italy is the Villa Lante, which stands about two miles northeast of Viterbo, on the edge of a village called Bagnaia. Fortunately, it is always accessible to visitors, for, says a recent writer, it is "the one in which the best qualities of all the others are united in a faultless whole," and its gardens are in a better state of preservation than is often the case. "The approach," we are told, "is up a narrow, dingy street, which ends at the entrance to the villa. The latter is comparatively small and is built on an incline which is a continuation of the grade of the street. In the centre of the first level a bronze fountain with four upright male figures plays in the middle of a square marble basin. The garden surrounding it, which is itself inclosed by tall hedges, is of the same proportions as the basin. From this level, two ramps, built in the approved Roman fashion, ascend to another on which stood the two little palaces of the estate, both alike and placed one at either side, say, a hundred and fifty, perhaps two hundred, feet of ground between. On the terrace that occupies this central space, a semicircular fountain in three stages abuts, and on either side staircases lead higher up. Another fountain is discovered on this second terrace, another appears on the third, still another adorns the fourth, and, finally, at the top, a wide basin with fountains above it reveals the source of the sparkling water that goes merrily down to the bronzes. It does not go through subterranean passages or through prosaic pipes. It flows from fountain to fountain through richly wrought stone channels; it falls from one basin to another, and what you see as you stand beside the highest of these many receptacles is a perfect arabesque of hoary stone with countless jets of silvery water gleaming in the sun. You see a succession of steps, inclines, balustrades and urns, all heavily decorated, all covered with flowers and vines, all shadowed, in spite of the sun, by magnificent Oaks, descending with indescribable pomp to the gateway far below. No words could picture the lovely scene."